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High intensity proton injector for facility of antiproton and ion research (FAIR)

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The high current ion source with the low energy beam transport (LEBT) would serve as injector into the proton LINAC to provide primary proton beam for the production of antiprotons. The pulsed ion source developed and made in CEA/Saclay, operates with a microwave frequency equal to 2.45 GHz based on ECR plasma production with two coils each with 87.5 mT magnetic field. The compact LEBT consists of two solenoids with a maximum magnetic field of 260 mT with two integrated magnetic steerers for adjusting the horizontal and vertical beam position. The total length of the compact LEBT is 2.3 m. The length reduced to minimize expected emittance growth along the beam line. For measuring ion be am intensity behind the pentode extraction system, between solenoids and at the end of the beam line a beam transformer and a Faraday cup will be installed. To get information about the beam quality and position the diagnostic chamber with different equipment will be installed between two solenoids. The proton injector has to deliver 100 mA proton beam with the energy 95 keV at the entrance of the RFQ with the emittance lower than 0.3π mm mrad (normalized, rms). This paper presents the status of the proton injector and proton LINAC for FAIR anti-proton research.